**BIOFEST TOPIC**

**9th grade topics (Biology)**

* + **Genetically Modified Organisms:** is an organism whose genetic material has been altered (GMO’s including cloning)
  + Genetic Modification Research
  + Genetically Modified Animals
  + Genetically Modified Crops
* **Genetic Screening for Diseases and Disorders:** analyzing people to determine genetic susceptibility to a particular disease
  + Pre-implantation Genetic Diagnosis
    - (screening embryos before in-vitro fertilization)
  + during Pregnancy
  + in Adulthood
  + gene-based conditions
* **Vaccination/ Immunization:** any substance used to stimulate the production of antibodies and provide immunity against one or several diseases
  + Pandemics
    - Such as H1N1
  + Mandatory Vaccinations
  + Parental Opt-Out
  + Links to Autism
* **Industrial or Environmental Biotechnology:** the development and use of biological systems for remediation of contaminated environments, and for [environment](http://en.wikipedia.org/wiki/Natural_environment)-friendly processes
  + *Bioremediation (Using Organisms to Solve Problems)*
  + Photoremediation
  + Pest Control for Crops
  + Pollution
* **Antibiotic Resistance:** is when a microorganism develops the ability to survive exposure to an antibiotic
  + Over-prescription of Antibiotics
  + How to Combat antibiotic resistant microbes
* **DNA Profiling:** (also called DNA testing or genetic fingerprinting) is a technique used to identify individuals based on their unique DNA profiles
  + Crime Scene Contamination Issues?
  + Use for Exoneration Purposes
  + DNA Databases

**10th grade topics (Chemistry)**

* **Biodefense** (is the term for all of the methods used to protect the population from exposure, or the consequences of exposure , to biological agents. (Daugherty, Ellyn. *Biotechnology: Science for the New Millennium*. St. Paul, MN: Paradigm, 2007. Print.)
  + Biological Weapons
  + Consequences of exposure to biological weapons
  + Methods to protect the population from exposure to biological weapons
* **Pharmaceuticals:** compounds manufactured for use as a medicinal drugs
  + Personalized Medicine
  + Pharmacogemomics - is the branch of [pharmacology](http://en.wikipedia.org/wiki/Pharmacology) which deals with the influence of [genetic](http://en.wikipedia.org/wiki/Genetics) variation on drug response in patients
  + Chemistry of Herbal Medicines
* **Stem Cells** (do not include the ethics of stem cells research): an undifferentiated cell that may differentiate into other types of cells
  + Use in research
  + Use in medicine
  + Use in therapy
* **Biofuels** (instead of Green Energy): A biofuel is a type of [fuel](http://en.wikipedia.org/wiki/Fuel) derived directly from living matter *(****not solar, hydro, wind or fossil fuels***)
  + Effectiveness of Biofuels
  + Government Funding of Bioenergy Energy Initiatives
* **Genomics:** the branch of [genetics](http://en.wikipedia.org/wiki/Genetics) concerned with the study of the [genomes](http://en.wikipedia.org/wiki/Genomes) of organisms **Bioinformatics**: the use of statistics and computer science to study molecular biology
  + Human Genome project
* The importance of the data
* How can this data help scientist
* **Biochemistry**: deals with the structures, functions and interactions of cellular components such as [proteins](http://en.wikipedia.org/wiki/Protein), [carbohydrates](http://en.wikipedia.org/wiki/Carbohydrate), [lipids](http://en.wikipedia.org/wiki/Lipid), [nucleic acids](http://en.wikipedia.org/wiki/Nucleic_acid) and other [biomolecules](http://en.wikipedia.org/wiki/Biomolecule)
  + Proteomics
  + Synthetic DNA
  + Biopolymers
  + Biodegradable polymers